



Nutrient and Bioactive Analyses of Forests Foods for Policy Making on Food and Nutrition Security in Central Africa



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Abstract

A serious public health challenge may be envisaged in central Africa, especially with a growing population, rapid westernization of traditional African diets and increasing demand for sufficient essential nutrients and bioactive compounds. However, having the second largest tropical rainforest basin in the world, forest foods that are widely consumed in Central Africa contain adequate essential nutrients such as carotenoids, flavonoids, proanthocyanins, polyphenols, vitamins C and E, Fe, Se, Ca and Na. This review purports that forest foods can considerably contribute towards meeting human nutrient requirements by replacing imported western foods that are generally more expensive and lower in essential nutrients. We recommend that forest foods should be considered in setting nutrition education strategies and formulating policies governing food and nutrition security in Central Africa.

Keywords: Forest diets; Human nutrition; Nutrient composition; Bioactive compounds

Introduction

Nowadays, it is widely understood that food security does not directly translate into nutrition security, as even diets that provide enough calories do not provide a balance of needed nutrients [1,2]. Forest foods form part of the human diets in all central Africa countries [1]. Yet, forest foods are often not promoted by national governments and donors, with focus on imported western dietary patterns as the standard to be emulated [2,3]. Forest foods are a major source of household food and nutrient intake, income and employment for millions of people in the tropical and subtropical forests of Central Africa and the Congo Basin countries [4]. The World Bank estimates that, more than 50% of the Central African forest population indirectly depends, to varying degrees, on forests for livelihoods, not just for food but also for fuel, livestock grazing and medicine [5]. During periods of scarcity of staple foods, these foods play an important role of 'safety net' in provision of household food calories and nutrients and food security [6]. Then again, among the Central Africa populations especially among the urban and elite, consumption of forest foods is infrequent or considered culturally inappropriate, resulting in these foods not being considered as part of

the strategies to address under nutrition and to achieve sustainable food security [7]. A number of studies have documented how consumption of forest foods is habitually considered as a peculiar habit practised by primitive people and considered as food for the poor [8]. However, isolated studies in Cameroon [9] and Gabon [10] revealed how forest foods are high in essential nutrients and bioactive compounds that are healthful. These isolated pilot studies cannot fully inform policies and strategies to address malnutrition and rampant food insecurity among forest dependent populations of Central Africa. The rapidly growing urban population and depletion of natural resources require rethinking of the food patterns and habits, particularly those relating to western foods. This mini review explores whether it is timely and appropriate to start considering forest foods as sustainable and viable food resources that can contribute to assuring food and nutrition security.

Cost of Malnutrition in Central Africa

Malnutrition is still a widespread problem in Central African countries, despite global improvements in recent

decades [11]. To achieve sustainable development for all, across the entire life-span, nutrition and health have been positioned as fundamental pillars of the sustainable development goals (SDGs), especially the second goal on ending hunger, achieving food security and improving nutrition and promoting sustainable agriculture by the year 2030 [12]. The United Nations Standing Committee on Nutrition report [11] and the global nutrition report [12] revealed that Central Africa countries, have unacceptably high prevalence of stunting, underweight and wasting. Available data reveals that among the Central African countries, Cameroon has the highest stunting, underweight and wasting prevalence among children aged below five years, followed by Congo Republic, Gabon and no data is reported for Democratic Republic of Congo [13-16]. In Cameroon, stunting prevalence among the under-fives is at 32.5% and underweight at 14.6%, with both stunting and underweight not improved compared to previous survey data of 32% for stunting and 18% for underweight [13]. Furthermore, the least stunting in Gabon is about 5 times and underweight in Gabon is 2 times, the levels expected in a normal healthy population as categorized by WHO making malnutrition a public health problem in Central African countries [12]. Malnutrition undermines the ability to fight diseases and infections. In Cameroon, infant mortality rates (IMR) and childhood mortality rates (CMR) are high, estimated at 62 and 122 deaths, respectively per 1,000 live births [12]. It has been estimated that 35-50% of under-five mortality in Central Africa are attributable to malnutrition [12]. Mortality rates of infants and children aged less than five years have not changed much in the past 20 years in Cameroon, Gabon, and Congo Republic [17]. It is estimated that if measures are not taken to reduce malnutrition, a 10% loss of lifetime earnings of an individual and 3% reduction in gross domestic product (GDP) are incurred in developing countries [5].

Nutrient and Bioactive content of Forest Foods and their role in Health and Nutrition

Pilot studies in Cameroon [2,9,18-20], DR Congo [21] and Gabon [10,22] indicate that forest foods have potential to contribute to calorie and essential macro and micronutrients requirements of the local communities. This has led to an assumption that health disorders related to inadequate intake of nutrients could be addressed through food-based approaches including forest foods and diversified agricultural systems, particularly by consumption of micronutrient and bioactive compounds rich varieties [23]. There is, however, limited information about the composition and the bioactive attributes of many forest foods. Nutrient analysis data of Central African forest plant foods for nutrient and bioactive compounds are limited to nutrient composition data of three forest fruits in Southern and Eastern Cameroon [9], nutrient composition and bioactive composition of five forest fruits consumed in Gabonese concessionaires of CEB and FIPPCAM in Eastern

Gabon [10] forest sourced spices in northern part of Cameroon [19] and phytochemical constituents of five selected medicinal plants in Cameroon [20]. For example, in Gabon, Fungo et al., [10] recently reported that edible pulps of *Panda oleosa* Pierre, *Gambeya lacourtiana* (De Wild.) Aubrév. & Pellegr and *Poga oleosa* Pierre contained substantial amounts of bioactive compounds; flavonoids (13.5-22.8mg/100g), proanthocyanins (2.4-7.6mg/100g), polyphenols (49.6-77.3mg/100 g) and vitamin C (6.7-97.7mg/100g). While in Cameroon Fungo et al., [9] also reported how the pulps of *Baillonella toxisperma*, *Pentaclethra macrophylla* and *Trichoscypha abut* were nutritionally rich. The pulp of *P. macrophylla*, were rich in total fat (38.71%) in protein (15.82%) and total fiber (17.10%) and some bioactive compounds; vitamin E (19.4mg/100g) and proanthocyanins (65.0mg/100g). Forest fruits of *T. abut* in Cameroon were found to be an excellent source of bioactive compounds; flavonoids (306mg/100g), polyphenols (947mg/100g), proanthocyanins (61.2mg/100g) and vitamin C (80.05 mg/100 g). Worth noting, nutrient composition data for the different wild animals consumed in central Africa are not available. However, these are scattered and isolated studies of a few selected forest foods. Conducting detailed studies on the nutritional value and bioactive compounds of forest foods consumed in Central Africa, is important because of the potential to provide data, which could be used by nutrition practitioners and policy makers to advocate for consumption and preservation of nutritionally beneficial forest foods. Paucity of scientific data has slowed down policy makers efforts to design appropriate approaches with respect to sustainable preservation of forests while addressing nutrition, health and food insecurity among forest communities.

Conclusion

This review tackles a fundamental aspect of the nutrition of forest-dependent communities in central Africa, where a diversity of indigenous edible forest foods abounds. This is particularly important in light of the high levels of poverty and malnutrition among these vulnerable populations, particularly during periods of critical food shortages. Forest foods can contribute significantly to household food and nutrition security and to the diversification of food systems, but only if local management systems and national policies ensure their sustainable extraction and use. While the few available analyzed forest foods can make considerable contributions towards meeting daily nutrient recommended intakes of vulnerable populations, thus, reducing malnutrition and food insecurity in Central Africa, there is urgent need for decision makers and development partners to ensure the evaluation of a wider range of local forest foods for their nutrient contents. There is need to adapt key nutrition interventions and programs and advocacy advices for communities on nutrition and health with links to available forest-based diets. Also, governments should consider promoting the local and available biodiverse

forest foods when proposing alternative sources of foods to forest-dependent populations. There is need to disseminate information on the nutritional and bioactive compositions of forest foods to policy makers and development partners to enable them to promote their consumption among the local populations.

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